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# Developing a co-creation space

Diplomityö, joka on jätetty opinnäytteenä tarkastettavaksi
diplomi-insinöörin tutkintoa varten.

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**Tiivistelmä**

Co-creation (yhteiskehittely tai yhteiskehittäminen) on yhteistyössä tehtävää luovaa toimintaa. Yhteistyöhön perustuvia luovan toiminnan metodeja tarvitaan ratkaisemaan uusenlaisia monimuotoisia ongelmia, jotka tunnetaan yleisesti englanninkielisellä termillä 'wicked problems.' Jos organisaatioissa kyetään käyttämään hyväksi niiden koko työvoimaa yhteistyön avulla, voidaan saavuttaa monimuotoisempi näkemys ja parempi pohja kehitykselle. Co-creationin avulla voidaan myös luoda arvoa paremmin yksilöille sekä yrityksille.

Diplomityön tavoite on antaa kirkkaampi kuva tarvittavista sekä toivotuista sekoista, jotka edesauttavat co-creation-tilan toimintaa. Diplomityö vastaa seuraaviin tutkimuskysymyksiin: Miksi käyttää co-creationin menetelmillä ja mikä edesauttaa co-creationia? Miten tila voi edesauttaa co-creationia?

Diplomityö on jaettu kahteen osaan. Teoreettinen viitekehys selvitetään ensin kirjallisuuskatsauksen avulla. Kirjallisuuskatsausta tukee tapaustutkimus, joka antaa syvemmän kuvan aiheesta. Koska diplomityössä ei tehdä hypoteeseja, on kyseessä laadullinen tutkimus.

Lopuksi annetaan yhdeksän ehdostusta co-creation-tilan kehittäjälle. Nämä ehdotukset ovat seuraavat: (1) Sidosryhmillä on oltava yhteinen käsitys co-creationin tarkoituksesta. (2) Ensimmäiset asiat, jotka on otettava huomioon ovat tavoite, sidosryhmät sekä itse tila. (3) Tilan tulee heijastaa tavoitteen pohjalta määriteltyjä arvoja. (4) Sekä sisäinen että ulkoinen avoimuus, yhteistyö ja jakaminen on tärkeää. (5) Tilan tulisi olla joustava. (6) Tilan tulisi houkutella ihmisiä. (7) Mahdollisuus rakentaa konkreettisia prototyyppejä on tärkeää. (8) Väliaikaiset tilat voivat olla tehokkaita co-creationin testaamiseen tapauskohtaisesti. (9) Co-creation-tila ei ole koskaan valmis.

**Avainsanat** yhteiskehittäminen, yhteiskehittely, co-creation-tila, yhteistyö, luova tila, tapaustutkimus

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**Abstract**

Co-creation is an act of collective creativity. Collective methods of creativity, such as co-creation, are needed to resolve the new complex problems known as wicked problems. A more diverse view and a better foundation for development could be obtained in organizations by taking full advantage of its workforce in collaborative means. Co-creation could also enhance the value created for the co-creating individuals and companies as well.

The goal of the thesis is to give a clearer view on what are the necessary and desirable aspects of a functioning co-creation space. The thesis answers in following research questions: Why to co-create and what enables co-creation? How the space can enable co-creation?

The thesis is divided into two parts: the literature review and the multiple case study. First, the theoretical background is mapped by a literature review. The literature review is supported with the multiple case study which gives a deeper insight on the subject. As hypotheses are not made in the thesis, the nature of the study is qualitative.

Nine suggestions for developing a co-creation space are given in conclusion. These suggestions are following. (1) Stakeholders should share a common understanding of the meaning of co-creation in this particular co-creation space. (2) The first things to consider are the goal, the stakeholders and the space. (3) The values that are derived from the goal of the space should be reflected by the space. (4) The openness, collaboration and sharing should be exercised both internally and externally. (5) The space should be flexible. (6) The space should attract people. (7) The possibility to build tangible prototypes and other physical presentations is important. (8) Temporary spaces could be effective on testing co-creation in a particular case. (9) The co-creation space is never ready.

**Keywords** co-creation, co-creative, space, co-creation space, co-creative space, collaboration, co-design, creative space, case study

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# 1 Introduction

## 1.1 Background and motivation

Aalto Design Factory (ADF) was started at 2008 as a research project and has later evolved to a platform for interdisciplinary co-creation. ADF is located at the Aalto University campus in Espoo at the capital region of Finland. Over the years, the concept has spread to other countries and universities. At 2017, there are 21 factories in the Design Factory Global Network (DFGN) in five different continents. At the ADF, co-creation is based on passion.

Among with the growing Design Factory Global Network comes the need to broaden the scope. In addition to the growing network, inquiries and help requests are beginning to come from other directions. One these inquiries came from Germany, where the car-manufacturer Volkswagen and the city of Wolfsburg had started a joint project to set up a "pop-up co-creation factory".

The incentive of the pop-up co-creation factory is to enhance the digital future and service development area at Wolfsburg. There was already a strong relationship as the headquarters and main factory of Volkswagen are situated in Wolfsburg. Now, the citizens and the communities of Wolfsburg are wanted to be included as well in the development. One of these communities is the city's football league VfL Wolfsburg which is interested in the culture of experimenting. The role of ADF is to facilitate the co-creation between the stakeholders and provide new ways of working.

As part of the Aalto University ecosystem, the perspective of ADF is heavily related to education. The former inquiry made it clear that new perspectives and insights on co-creation spaces in different contexts are needed. How co-creation spaces are developed in different settings? The question cannot be entirely answered based on the experience and knowledge gained on the Design Factory platform alone. The topic of this thesis was generated around these aspects.

## 1.2 Objectives and research questions

The goal of the thesis is to give a clearer view on what are the necessary and desirable aspects of a functioning co-creation space. First, the need for co-creation must be validated. This is done by finding out the reasons behind co-creation; why to co-create? Second, after the use of co-creation is validated, the aspects that enable co-creation are inspected; what enables co-creation? Thus, the first research question is framed in a following way:

1. Why to co-create and what enables co-creation?

After having established the setting for co-creation, the physical aspect is taken along. Having clarified 'why' and 'what' the focus shifts to 'where'. The modern world offers plenty of possible platforms for co-creation. However, the topic of the thesis was limited to cover the physical spaces for co-creation. Therefore, the second research question is framed in a following way:

2. How the space can enable co-creation?

The research questions produce more subsequent questions that are considered in the thesis. What kind of co-creation spaces are already established? What are the goals and starting points of these spaces? What are the characteristics of a well-functioning co-creation space? What are the best practices for developing a co-creation space? How are they developed further? What can we learn from them?

The notion of pop-up or temporary co-creation spaces was also briefly investigated. Is co-creation possible in temporary space? Could the use of pop-up spaces be beneficial in developing co-creation spaces? What are the differences of developing a permanent or temporary space?

One incentive of the thesis was also connecting to other people working with co-creation spaces and thus sharing ideas, knowledge and experience beyond the existing Design Factory Global Network. The outcome of the thesis was not wanted to digress too far from the perspective of Aalto Design Factory. Therefore, the thesis is mostly focused on spaces related to design, technology or business as these are the cornerstones of Aalto University and Aalto Design Factory.

## *1.3 Structure*

The thesis is divided into two parts: the literature review and the multiple case study. First, the theoretical background is mapped by a literature review. The literature review is supported with the multiple case study which gives a deeper insight on the subject. As hypotheses are not made in the thesis, the nature of the study is qualitative.

The literature review has four themes: the definition of co-creation, the enablers of co-creation, the building blocks of co-creation space, and finally, examples of spaces with co-creation elements. Peer-reviewed articles were emphasized in the literature review. Also, some other literary works from authors with academic background were included. References with less academic impact, such as official websites, were used in the description of the examples. Literary works on fields of design literature, and business and marketing were the primary literature sources in the review.

The concept of co-creation is not yet implicitly established and thus the associated literature is quite diverse. Moreover, as the phenomenon of co-creation spaces is rather new and physical co-creation spaces have been mostly established during the recent years, academic literature on the subject is still imperfect and inadequate. This makes comprehensive analysis of the subject difficult. Therefore, the subject was further investigated with a qualitative multiple case study (see chapter 3 for methodology).

Literature on the topic of pop-up spaces proved challenging to find. Therefore, open interview with an expert was conducted. The interviewee Ransu Helenius has worked on several pop-up space projects at Aalto University and achieved an expert status on the field. Examples of such projects are the Paviljonki built for the World Design Capital® Helsinki 2012 (see e.g. Hakala 2012; Kantonen 2015) and Aika stage built for Suomi-Areena.

# 2 Co-creation in literature

The literature is divided in four parts. First, the definitions of co-creation are outlined and incentives for co-creation are examined. Second, the enabling factors of co-creation are discussed. The importance of stakeholders, experiences, physical space and facilitation are covered. Third, the building blocks of co-creative space are considered. This part covers collaborative innovative, creative and knowledge-creating spaces. Also, a model for evaluating the user experience of spaces is introduced. Lastly, some examples of co-creative spaces are given.

## *2.1 Co-creation*

This chapter gives a general view of co-creation in design and business context. In this chapter, the definition of co-creation is described and outlined. First the definitions of co-creation in design and business literature are examined. Also, reasons and incentives to co-create are discovered and discussed.

### 2.1.1 Definitions of co-creation

According to the Oxford Dictionary (Oxford Dictionaries 2017), the word 'co-create' consists of two parts where the prefix 'co-' means 'joint', 'mutual' or 'common' when used to form nouns, 'jointly' and 'mutually' when used to form adjectives and "together with another or others" when used to form verbs. The verb 'create' means "bring (something) into existence" and the noun 'creation' means "the action or process of bringing something into existence".

Several different definitions of co-creation can be found in the literature. Few authors have distinctly different views of co-creation. To make matters worse, some of the terms used to describe the collaborative activities, such as co-creation or co-design, are used as synonyms - even in the academic literature (Sanders & Stappers 2008).

Sanders and Stappers (2008) define **co-creation** as an **act of collective creativity**. This definition is based on the note that all people are creative. Sanders and Stappers continue that "[b]y co-design we indicate collective creativity as it is applied across the whole span of a design process […]. Thus, co-design is a specific instance of co-creation." They determine co-design more broadly as co-creation of designers and non-designers working together during the whole design development process. The term 'collective creativity' is also used as a synonym for co-creation. (Sanders & Stappers 2008.)

On the contrary, according to a literature review by Mattelmäki and Sleeswijk Visser (2011), co-creation is a temporary moment within the co-design process**.** Whichever definition is chosen to be used, it must be noted that the definitions of co-creation and co-design are closely interweaved.

The before mentioned definitions are mostly used in design literature. In design literature, co-creation is focused on the co-creation process itself. In business and marketing literature, co-creation is often related to value creation and focused on the value itself.

One of the first definitions of co-creation is by Kambil et al (1996). According to them, **co-creation is the creation of value together with the customers**. This co-creator role is one of the four roles that the customers can adopt, the others being buyer, user and transferor. Kambil et al. (1996) states that company strategies should be focused on creating and delivering value propositions to the customers and extracting and transferring value to the stakeholders.

Prahalad and Ramaswamy (2000, p.80) state that the "[c]ustomers are stepping out of their traditional roles to become cocreators [sic] as well as consumers of value." A few years later, Prahalad and Ramaswamy (2004a, p.8) define co-creation as following: "Co-creation is about *joint* creation of value by the company and the customer."

Co-creation is also related to the service-dominant logic of marketing. According to Lusch and Vargo (2006, p.44), one of the eight foundational premises of the service-dominant logic is that "The customer is always a co-creator of value". According to Mattelmäki and Sleeswijk Visser (2011), this view generates some confusion: "methods that were developed for co-designing with potential users or other stakeholders are now utilised in service design to create potential service solutions with clients, the solutions of which are then to be co-created with customers and producers."

The value discussed in business literature is often perceived as monetary value. However, at least three different types of value can be recognized in the value in co-creation: monetary, use or experience, and societal value. These different values are not entirely distinct but might link, overlap or even cooperate with each other. (Sanders & Simons 2009; Sanders & Stappers 2012, p. 26.)

Sanders and Stappers (2012, p. 27) connect the design and business views of co-creation in a following way. Co-creation, and therefore also value co-creation, can take place in every stage of the design process. Societal value co-creation most probably occurs in the early stages of the design process. Furthermore, value co-creation for use or experience occurs during the design process. Lastly, monetary value is co-created in the later stages of the design process. (Sanders & Simons 2009; Sanders & Stappers 2012, pp. 26-27)

Sanders & Stappers (2012) develop the figure further by dividing the co-creation as a technique, method and mindset. They state that co-creation is most commonly seen merely as a tool or technique. Moreover, co-creation can also be perceived as a method, or in a more broader view, as a mindset. According to them, co-creation as a mindset has the most potential to effect in people's lives.

### 2.1.2 Why to co-create?

The design process is changing. The problems that the designers are dedicated to resolve are becoming more vague and challenging. (Sanders & Stappers 2012, p. 22.) These problems are known as 'wicked problems' (Rittel & Webber 1973). In addition to designers, other professionals working with innovation activities are also facing wicked problems (Aalto Design Factory 2017, p. 14). Wicked problems can no longer be resolved by individuals alone. Instead, collective methods of creativity, such as co-creation, are needed. (Sanders & Stappers 2012, p. 22.) A more holistic view must be adopted to oppose the complex problems (Aalto Design Factory 2017, p. 14).

A more diverse view and a better foundation for development could be obtained in an organization by taking full advantage of its workforce. There is potential in utilizing the average workers, the majority, instead of focusing on individual 'star players'. Relying on to the few individuals, the star players, might become risky as they can easily get tired on the pressure and quit the project or the organization. Besides, not all organizations even have star players on their league. The use of co-creative processes could also attract new people to join the organization. (Aalto Design Factory 2017, p. 16.)

In the business and marketing point of view, the intention of value co-creation is to create more personal value for the individuals (Prahalad & Ramaswamy 2004b, p. 10). According to Ramaswamy and Gouillart (2010) the purpose of co-creation is to serve all the stakeholders. Their focus is on the experiences and interactions of the stakeholders. They state that by sharing their experiences, the stakeholders will better understand each other, and therefore, the experiences of all the participants are improved. In addition to the improved experiences, the stakeholders would also be rewarded by co-creation with increased economic value, such as better earnings or better chances to advance, and psychological value, such as better self-esteem or satisfaction.

For the companies, the advantages of co-creation would be increased economic value, such as lower costs and risk and higher productivity. Co-creation could also lead to new business insights. On strategic level, the new strategic moves gained by co-creative means might be superior to those developed on traditional methods as the experiences and interactions of the stakeholders are not easily mimicked and repeated by competitors. (Ramaswamy & Gouillart 2010.)

## *2.2 Co-creation enablers*

In this section, the importance of some enabling factors of co-creation are investigated. These enabling factors are the stakeholders, experiences, physical space and facilitation.

### 2.2.1 The importance of the stakeholders

As seen on the different definitions of co-creation, the co-creation is a joint or collective process. According to Ind and Coates (2013), if they are motivated and if the right processes and conditions exist, everyone could take part in creative processes. Sanders and Simons (2009) state the most important factor for successful co-creation is the right mindset. Unfortunately, these 'right' processes, conditions or mindset are not described further, thus leaving the statements somewhat vague.

According to Ramaswamy and Gouillart (2010) the co-creation process should produce value to the stakeholders as well. This would result to a more efficient participation of stakeholders. Ramaswamy and Gouillart state that this is best done by focusing on improving the experiences of the stakeholders. Experiences are discussed further in the chapter 2.2.2. The stakeholders should be allowed to design their way of working by themselves inside the boundaries given by the co-creation facilitators. (Ramaswamy & Gouillart 2010)

Sanders and Simons (2009) have recognized some examples of stakeholders and their interactions where co-creation is taking place: co-creation within communities, co-

creation inside companies and organizations, co-creation between companies and their business partners, and co-creation between companies and their customers (also referred to as consumers, users or end-users). Ramaswamy and Gouillart (2010) advise to begin with a few key stakeholders whose experiences related to a specific purpose are first focused on and gradually include more experiences and stakeholders.

Sanders and Stappers (2014) state that expressions of such words as user, consumer and client are too narrowing and are causing uneasiness on people. Instead, they suggest calling them participants, partners or people. They also note that in product or service development, instead of focusing to the end-users, all other related people such as trainers, assemblers and bystanders, should be involved. (Sanders and Stappers 2014) Including several different stakeholder groups gives a wider perspective and area of expertise for co-creation (Aalto Design Factory 2017, p. 21). Sanders and Simons (2009) also emphasize the importance of empathy towards the people involved.

### 2.2.2 The importance of experiences

Sanders (2001) states that everyone is creative. However, most people are not actively being creative. Instead, their creativity is latent. Sanders also states that "*There is a wellspring of creativity that all people possess when it comes to experiences meaningful to them."* According to Sanders, collective creativity can be more powerful than individual creativity and thus the collective creativity of these people is immense. (Sanders 2001.)

By inviting the everyday people to the development process their needs can be satisfied better. The people buying and using products create their own experiences, and their creativity derives from these experiences. Further, understanding the experiences of these people is the key to involving them in the development and co-creation process. (Sanders 2001, 2005.) Sanders (2005) defines experience and experiencing as following:

> *Experience is a subjective event, felt only by the person who has the experience. Experiences that have already been lived and felt are called memories. Experiences not yet lived or felt, but imagined are called dreams. Experiencing is the point where memory and imagination meet.*

Sanders (2005) continues that to understand the experiences, all the above experience sections should be examined by looking at what people say, do and make. The recent past and future are covered by listening to the people (what people say). The information gathered this way is explicit knowledge, in other words, knowledge that can be expressed in words. The present is covered by observation of the people (what people do). This is observable information. The farther past (memories) and future (dreams) are covered by make tools (what people make). This information is tacit knowledge, information that cannot be described with words. (Sanders 2001, 2005.)

The tools for making are provided for the participants to work with. Sanders (2005) calls these 'make tools'. The make tools contain visual and ambiguous stimuli that enable creative expression. Their purpose is to activate memories and feelings and to make room for the individual interpretations of the people. By being visual, the tools are not binding the people to use words. The people can more efficiently express their experiences and feelings by the ambiguous and visual nature of the make tools. (Sanders 2005.)

According to Sanders (2001; 2005) the perceptions of *what people do* and *what people say* is not enough; It is the notion of the *what people make* to the design process that enables co-creation. When all these three aspects are examined together "we are able to understand the experience domains of the ordinary people we are serving" (Sanders 2001).

According to Prahalad and Ramaswamy (2004b, p. 10), "[t]he co-creation experience of the consumer becomes the very basis of value". Prahalad & Ramaswamy (2004a) state that an experience environment for the consumers should be established for their active dialogue and co-construction of personalized experiences. The experiences of the consumers are based on how they interact with the experience environment facilitated by the company.

### 2.2.3 The importance of physical space

Prahalad and Ramaswamy (2004a) emphasize the importance of direct interactions between consumers and companies. "Being there" and co-creating with consumers gives the companies a better insight on consumer behavior (Prahalad & Ramaswamy 2004a). However, this view is focused on co-creation with consumers. The view of Ramaswamy and Gouillart (2010) is a bit more extensive. They state that the best way to co-create is to "invite all interested parties to interact directly". Ramaswamy and Gouillart (2010) also suggest inviting more stakeholders during the process.

Altogether, direct interaction between the stakeholders is strongly accentuated by both views. According to Sanders and Simons (2009), a physical space has an important part in co-creation as face-to-face participation enables real-time participation. Face-to-face communication also empowers empathy between the co-creators (Sanders & Stappers 2012, p. 26). Ind and Coates (2013) suggest that a safe space that combines the imagination of individuals to the external world and allows spontaneity, play and exploration could stimulate creative thinking.

Lee et al (2010) investigated on how the physical proximity of the research collaborators influenced the scientific impact of their publications at Harvard University. Their conclusion was that physical proximity and the level of intra-building collaboration had a positive effect on the publication impact. However, they state that further research is necessary for deeper understanding of these relationships and validating the results in other organizations.

According to Sanders and Stappers (2012, p. 57), the physical environment and the available materials could support in stimulating creative thinking and innovation. Generating visual and tangible objects could trigger the interest of designers and involve them in spontaneous discussion, reflection and ideation (Aalto Design Factory 2017, p. 18). Sanders and Simons (2009) state that it is essential to the co-creation process to visualize the collective assets.

### 2.2.4 The importance of facilitation

Pirinen (2016) has researched the barriers and enablers of co-design for services. According to Pirinen organizations have flaws in their practical application of co-design methods which further hinders the implementation of co-design. The organizations are relying on external facilitators in co-design. Hence, Pirinen states that providing facilitator training and portable co-design toolkits could help in addressing the problem.

As his research is focused on services, Pirinen (2016) indicates that similar results could be found in design projects in general. However, this should be investigated further. In his article, Pirinen uses the definitions of 'co-design' by Sanders and Stappers (2008). As discussed in chapter 0, "This chapter gives a general view of co-creation in design and business context. In this chapter, the definition of co-creation is described and outlined. First the definitions of co-creation in design and business literature are examined. Also, reasons and incentives to co-create are discovered and discussed.

Definitions of co-creation", this definition states that co-design is a specific instance of co-creation. However, this does not necessary mean that the notions by Pirinen could be generalized to concern all co-creation. (Pirinen 2016)

In their study, Vaajakallio and Mattelmäki (2017) found the role of the facilitators important in acquiring more specific ideas during the working activities. In addition to organizing the activities, the facilitators also helped the co-creators in finding possible subjects for development.

## *2.3 The building blocks of the co-creation space*

In this chapter, the building blocks of co-creative space are considered. This part covers collaborative innovative, creative and knowledge-creating spaces. Also, a model for evaluating the user experience of spaces is introduced.

### 2.3.1 Collaborative space

According to Sanderson and Simons (2009) the co-creation is a specific form of collaboration where the object is to create something unanticipated or surprising. Ind and Coates (2013) explain that, instead of focusing to finding individual creativity, the efforts should be focused on making groups more productive. According to them, this is done by creating an atmosphere where people trust each other as well as the organization.

Wycoff and Snead (1999) state that the majority of meeting and conference rooms are designed for presentation and not collaboration. These spaces are more related to control and order, instead of co-creation. According to them, superior and more innovative project results emerge from collaborative rooms. They also suggest fundamentals to be considered when designing a collaboration space. These fundamentals are interaction, visual thinking, beauty, fun, abundance and tools.

### 2.3.2 Innovative space

Oksanen and Ståhle (2013) have studied how physical space and innovation and innovativeness are connected. They propose five attributes of innovative space based on their analysis on how the physical space affects innovation. These attributes are collaboration enabling, modifiability, smartness, attractiveness and value reflecting. Oksanen and Ståhle also discuss the idea of space as an innovative service.

Since innovation and creativity both are social processes, **collaboration and communication** are important elements of innovative space. Knowledge and experience sharing should be encouraged and enabled by the space design as it would result to greater innovativeness. (Oksanen & Ståhle 2013.)

Oksanen and Ståhle (2013) point out that individual work can be difficult in spaces dedicated to collaborative work. They also state that "Innovative work and learning requires flexible ways of doing." Thus, the **modifiability** of the innovative space is essential. Modifiable spaces can change in response to the needs of their users. The same space can also serve in various situations. Modifiable spaces also offer opportunities for the users to act differently and innovatively. (Oksanen & Ståhle 2013.) Kristensen (2004) has also stated that flexibility could facilitate creativity because creativity seems to be personal and personalized.

The **smartness** or **intellectuality** of a space is most obviously connected to technology. The so-called smart spaces are usually equipped with technological such as intelligent objects and user interaction means. But according to Oksanen and Ståhle (2013) the intellectuality of a space goes beyond technology: "intellectual space is a part of a socio-technical ecosystem and a platform on which people will build various meanings." (Oksanen & Ståhle 2013.)

Finally, the space should be **attractive**. According to Oksanen and Ståhle the comforting spaces are also attractive. Several independent elements influence the attractiveness of the space. These elements could be, for example, the architecture, interior design, ergonomics, location and services of the space. (Oksanen & Ståhle 2013.)

The values and the story of the organization can be interpreted by looking at spaces related to it. Therefore, the innovative space should **reflect the values** of its parent organization. Oksanen and Ståhle also point out that values related to innovation, such as openness, collaboration and sustainability, have begun to converge with values related to creative and innovative spaces. (Oksanen & Ståhle 2013.)

### 2.3.3 Creative space

Thoring et al. (2012a) point out that even though the space is critical factor of collaborative creative work, the amount of research on the effect on environment on creativity is limited. Their own research (Thoring et al. 2012a; 2012b) is focused on creative spaces in educational context. Thus, the results cannot be generalized to creative spaces in other domains without further research.

According to Thoring et al. (2012a), different types of creative activities, such as inspiration, communication, experimentation, creation, decision-making or presentation,

can be reinforced by different types of creative spaces. They also state that a better comprehension of the relationship between the **types** of creative spaces and **functions** of creative spaces would help in designing educational spaces. Therefore, the educational space would enhance the creative process and answer the needs of the students better.

Thoring et al. (2012a) have identified five types of creative spaces:

1. The Solitary space is a silent space for individual work that enables thinking and meditation.
2. The Team space is a space which layout enables team work and communication. It is more playful and noisy than the Solitary space.
3. The Tinkering space is a space for experiments and testing. It can also contain tools for building things.
4. The Presentation space is a space passively consuming input and actively giving input. The input could be, for example, lectures, presentations or exhibitions.
5. The Transition space is a category for spaces which are not dedicated but are impacting the creative work, such as hallways, cafes and parking lots.

In addition to the types of creative spaces, Thoring et al. (2012a) also recognized several functions of creative spaces:

1. The Knowledge Repository function describes how information can be stored in the space. For example, books in the bookshelf or whiteboards on the wall. It should be noted that visual information is easily accessed by people.
2. The Indicator of Culture function describes how the space expresses how people should behave. These aspects can be signaled by the space layout or just by trusting the common sense of people. For example, library and workshop might trigger different behavior on people.
3. The Process Manifestation function describes how the space might "enforce specific procedural behaviours". By organizing the furniture in different ways different behavior might be triggered. For example, chairs should be organized differently for group work and lectures. This function emphasizes the importance of flexible furniture.
4. The Social Dimension function describes how the spaces enables social interaction, such as group work, exchanging information or just meeting other people. Social Interactions are seen to have an important part of the creative work.
5. The Source of Stimulation function describes how the space can stimulate the users in a creative way. On the contrary, also the lack of stimulation might enhance creativity. The stimuli could be, for example, different textures on the walls, inspirational posters or games.

**Error! Reference source not found.** shows the suggested typology by Thoring et al. (2012a). The figure shows the relationships between the types of creative spaces and the functions of creative spaces. The typology shows that some types of creative space could contain several functions. None of the spaces, however, contains all the identified function. Also, none of the spaces, even the Transition space, is not without functions.

**Table 1.** Suggested typology of creative spaces. (Thoring et al. 2012a)

| | Solitary Space | Team Space | Tinker Space | Presentation Space | Transition Space |
|---|---|---|---|---|---|
| **Knowledge Repository** | + | ++ | | ++ | + |
| **Social Dimension** | | ++ | + | + | ++ |
| **Culture Indicator** | ++ | ++ | ++ | ++ | + |
| **Stimulation** | | ++ | ++ | ++ | |
| **Process Manifestation** | | + | ++ | ++ | + |

+ = partial coverage, ++ = full coverage

None of the described spaces were a co-creation space in its purest form. However, by definitions, co-creation space is a space for collective creation. Therefore, all the types of creative spaces that include the social dimension function, that is all except the Solitary space, could be relevant in studying co-creation spaces. The Team space and Transition space could be most interesting to study further as they cover the social dimension in full. It might also be studied further how the coverage of social dimension in those spaces not yet fully covered could be enhanced.

### 2.3.4 A space for knowledge-creation

There is a connection between creativity and knowledge. According to Kristensen (2004), "creativity is a process that brings new knowledge". Ind and Coates (2013) claim that creativity results from engagement and knowledge. Prahalad and Ramaswamy (2004b, p. 171) state that new knowledge must be continuously co-created in order to continuously co-create value. This is achieved by creating knowledge environments.

Nonaka and Takeuchi (1995, p. 50, 56) also emphasize the importance of understanding how organizations create knowledge. According to them, the new knowledge is the factor that enables innovation and, for example, the creation of new products. The knowledge creation process is thus the foundation for development. Still, the knowledge creation is not a separate entity. During innovation, companies not only process existing, but also create new information and knowledge:

> *When organizations innovate, they do not simply process information, from the outside in, in order to solve existing problems and adapt to a changing environment. They actually create new knowledge and information, from the inside out, in order to redefine both problems and solutions and, in the process, to re-create their environment.* (Nonaka & Takeuchi 1995, p. 56)

According to Nonaka and Takeuchi (1995, p. 59, 70, 72), knowledge is created by individuals. Therefore, the company cannot create knowledge without individuals. The role of the organization is to support the individuals and to provide them a context for knowledge creation. The organization is also responsible for facilitating group activities to support knowledge creation.

To understand the knowledge creation, the knowledge itself must be examined further. Two distinct forms of knowledge can be identified: explicit and tacit knowledge. Tacit knowledge was first presented by Polanyi (1966/2009, p. 4) who stated that "we can know more than we can tell". *Explicit knowledge* is knowledge that can be expressed in "formal, systematic language". *Tacit knowledge* is knowledge that is "personal, context-specific, and therefore hard to formalize or communicate". (Nonaka & Takeuchi 1995, p. 59.)

The tacit knowledge is created by sharing experiences. Moreover, it is the interaction of explicit and tacit information that enables the creation of knowledge. The interaction between explicit and tacit knowledge is also where innovations are generated. (Nonaka & Takeuchi 1995, s. 59, 62, 70).

### 2.3.5 A space for a better user experience

The user experience of a place can be evaluated using the 6T model developed by Nenonen and Kojo (2014). **The 6T model** consists of six segments: tune, tempo, task, tie, tale and theme. The 6T model can be applied to gain a holistic view of the users' intangible experience of the place. In addition to analyze the user experience of already established and functioning places, the 6T model can also be applied in designing and developing user-centered workplaces. (Nenonen & Kojo 2014; Kojo & Nenonen 2013.)

The model was used to evaluate the user experience of Aalto Design Factory (ADF). They conducted a survey and interviews structured according to the 6T model to the users of ADF. Even though the results of their research cannot be generalized further without more expansive research, their findings could give some insight on what factors should be considered in developing other co-creation spaces with similar motivation. (Nenonen & Kojo 2014; Kojo & Nenonen 2013.)

**Tune** (Atmosphere) describes the atmosphere of the space by the means of sensory environment and cognitive symbols. The design and the people of the space were both seen as vital building blocks of the atmosphere. The people of the space, or more closely, their communication affects the atmosphere. This overlaps a bit with the tempo and the tie elements. The spatial features that support inspiring atmosphere are for example cozy spaces, open doors and the tone of instructions. Also, the decoration of the space, such as using bright colors, imaginative decorations and versatile materials and textures are considered. (Nenonen & Kojo 2014; Kojo & Nenonen 2013.)

**Tempo** (Frequency) describes the use, sense or rhythm of time in the space (Nenonen & Kojo 2014; Kojo & Nenonen 2013). In the ADF research context, the tempo was portrayed by the informality of the space. The informal atmosphere was perceived as one element which attracted people to the space. Spatial solutions to support the informality were for instance open environment, places that collected people together, and playful activities or decoration. (Nenonen & Kojo 2014.)

**Task** (Functionality) describes the functionality of the space. The functionality can be experienced through multi-usable building and spaces. The facilities should adapt to the differentiating needs of their users. The space itself can also suggest different ways of working to their users. Spatial solutions to support functionality could be, for example, easily movable lightweight furniture and use policies that enables the modification of the space. (Nenonen & Kojo 2014; Kojo & Nenonen 2013.)

**Tie** (Familiarity) describes the familiarity and usability of the space. The space should have a welcoming atmosphere and it should be easily accessible so that it would, like the tempo, attract people to the space. This can be supported by spatial solutions and services, such as friendly policy to answering the doorbell and making sure there is some action near at the entrance. In addition to spatial features, the welcoming atmosphere was experienced to be engendered mostly by behavior of the people at ADF. (Nenonen & Kojo 2014; Kojo & Nenonen 2013.)

**Tale** (Narrative) describes the constant narrative or story of the space. The purpose of the space should be properly communicated to the users. The narrative of the space could also be used to guide the users and their actions respectively. The narrative could be supported with spatial solutions such as displaying of outcomes from earlier project performed in the space, and consistent visuality, such as signs and furniture, of the space. (Nenonen & Kojo 2014.)

**Theme** (Importance) describes the meaning and importance of the space. In the research this was measured by how the space enabled the users to be themselves. More precisely, the users were not expected to act according to a fixed behavior model. This was mostly experienced to be due to the people at ADF, but also some spatial elements, such as informal communication spaces and before mentioned welcoming atmosphere, were seen relevant. (Nenonen & Kojo 2014.)

At Design Factory, two building blocks of user experience were discovered: the people and the space. More closely, the user experience was seen to derive from the activity and interaction of the people. Furthermore, this was supported by spatial solutions of the DF building. (Nenonen & Kojo 2014.)

## *2.4 Examples of spaces with co-creative elements*

Lastly, some examples of co-creative spaces are given. First, some localized spaces of collaborative innovation are considered. Second, co-creation in lean philosophy is examined. Last, the concept of pop-up spaces is discussed.

### 2.4.1 Fab labs and other localized spaces of collaborative innovation

A Fab Lab is “a technical prototyping platform for innovation and invention, providing stimulus for local entrepreneurship.” Other activities encouraged at Fab Labs are playing, creating, learning, mentoring, inventing and innovation. As the Fab Labs are spread around the world, a global network of Fab Labs, “a distributed laboratory for research and invention”, is being established. (Fab Foundation 2016)

All the Fab Labs have same equipment, such as laser cutters and 3D printers, and they share same processes. The software used is open-sourced. In addition to being prototyping platforms for entrepreneurs, Fab Labs are also being established in educational environments. Sharing and learning from each other is the key theme at Fab Labs. (Fab Foundation 2016.) Fleischmann et al. (2016) state that Fab Labs have a strong role in facilitation of co-creation processes because they concentrate on learning and sharing of citizens or end-users instead of experts. However, they admit that Fab Labs are somewhat lead by experts.

Similar open spaces for prototyping are also maker-spaces, hacker-spaces and living labs. Capdevila and Moilanen (2013) call hacker spaces, maker spaces, Living Labs, Fab Labs or co-working spaces as "localized spaces of collaborative innovation" (LSCI). They state that these LSCI spaces enable of collective innovation for the knowledge communities. They also name some common characteristics to these spaces. First, LSCI's are open for the public. Second, the members of the LSCI's have collectively agreed on the focus and goals of the spaces. Third, information and tools are shared among the members and the members are further encouraged to share knowledge.

### 2.4.2 Co-creation in Lean Philosophy: Big Room and Knotworking

The *Big room* concept was created by Toyota in the 90's as part of the Toyota Production System (Morgan & Liker 2006, pp. 125-126). In Japanese, the concept is called *Obeya* which can be translated as 'big room' or 'control room' (Liker 2004). The Big Room concept has two main purposes: information gathering and information management (Morgan & Liker 2006, p. 153).

The Big room is a physical space where members of a cross-functional team gather together for decision-making. Thus, the team should contain all the vital decision makers, such as designers, engineers or customers, involved in a common project. By collecting the key people to a single room, decisions can be made more efficiently. Time is saved when unnecessary communications, such as minor meetings and long and disorderly email conversations, are avoided. (Javadi et al. 2013; Morgan & Liker 2006, pp. 153-154)

The decision-making is supported by visualized information presented in the Big room. Usually, the walls of the room are covered with information and key figures related to the project. All the team members have shared understanding as they have access to the same mutual information. Therefore, they can make decisions more equally. (Javadi et al. 2013; Morgan & Liker 2006, p. 153.)

*Knotworking* is a Finnish application of Big Room. The Knotworking concept has been used, for instance, in healthcare organizations, libraries, schools and universities, and construction industry. Knotworking is quite similar to the Big Room concept but the collaboration of the group is more focused on the critical phases of the design process. Therefore, the identification of these critical phases is important in Knotworking. The Knotworking sessions can also be used for solving problems when, in addition to the solutions, also the root causes are sought out. Some benefits of Knotworking are improved efficiency, rapid information flow between the designers, and the possibility to learn from other participants. (Kerosuo et al. 2013.)

### 2.4.3 Pop-up Space

The word 'pop-up' is defined as a shop or other business which opens quickly and is only operating for a short time (Oxford Dictionaries 2017). The term 'pop-up space' does not have one strict definition but it seems to be generally used for temporary spaces.

According to Helenius (2017), the most important factors are that the space itself has a roof and lots of empty space. Minimal limitations and restrictions should be strived for.

In addition, the pop-up space should have one or two facilitators. The physical characteristics of the space should emphasize openness. It is more important that the space is designed for creation instead of making the space as impressive as possible. (Helenius 2017.)

One example of a pop-up space where co-creation occurred is the Paviljonki ('the pavilion') built for the World Design Capital® Helsinki 2012 program. The Paviljonki was situated in the center of Helsinki. It functioned from May to September 2012 and the building was demolished afterwards. Openness and communality was strongly emphasized in the design and performance of the Paviljonki. Apart from the triangular shaped café, the building had no walls. Paviljonki was open for groups to organize events and workshops. (Hakala 2012; Kantonen 2015.)

The construction of temporary space is slightly different to permanent spaces. There might are also be differences in construction permits. For example, in Finland, the Land Use and Building Act (132/1999 § 176) states that aberrations could be made for temporary buildings with lifespan with maximum period of five years. Also, when designing temporary spaces, the ecological aspects and demolition of the space should be considered already during the design phase (Helenius 2017).

# 3 Methodology

Comprehensive analysis of the topic of the thesis is difficult as the concept of co-creation is not yet implicitly established and thus the associated literature is quite diverse. Therefore, the subject was further investigated with a qualitative multiple case study. The nature of the multiple case study is qualitative as it does not answer to hypotheses.

The cases were selected to represent the diversity of co-creation spaces. The cases, as well as the related stakeholders and goals, were quite different from one another. This might give a more comprehensive understanding of the co-creation spaces in general. Aalto Design Factory was consciously excluded from cases as the point of the thesis was to seek new perspectives on co-creation spaces.

Altogether, four cases were examined. Two of the cases were primarily related to academic environment, one was related to a company and one was a public space related to a certain city. The cases are presented in Table 2 and in more detail in Chapter 4.

**Table 2.** Details of the interviews of the case study.

| Case | Name | Position |
|---|---|---|
| Openlab Stockholm | Ivar Björkman, | Executive Director of Openlab Stockholm |
| ABB Innovation Center | Marjukka Mäkelä * | Strategic Digital Lead at ABB Digital |
| ABB Innovation Center | Juha Alamäki * | Manager of Collaborative Operations Center |
| Iso Omena Service Centre, City of Espoo | Veera Vihula | Project Manager at Iso Omena Service Centre |
| DTU Skylab | Mikkel Sørensen | Head of DTU Skylab |

* Interviewed together

Methodological triangulation is used as the data is collected by several means. The most important source of data are the semi-structured interviews. All the interviews were individual interviews, except for the one where two people were interviewed together. The interviewees were chosen so that they could tell as extensively as possible of the related case. The interviewees did not receive the questions beforehand. A general outline of the topics of the interview and description of this thesis were given beforehand. The interviews were recorded with the permission of the interviewees. The interviews were transcribed based on the recordings. In addition to the interviews, available information concerning the spaces of the cases is collected from the Internet and from the case-related people. As all the selected cases included a physical space it was seen essential to also visit the spaces. Field notes and pictures taken during the visits are also used.

The analysis of the results of the case study were conducted primarily based on the transcribed interviews and field notes. The results were grouped under recurrent themes. The results of the case studies were compared with each other. Common and differing aspects were noted between the different cases. The results were also compared to the findings of the literature review.

# 4 Case studies

In this chapter, the case studies are presented based on the interviews and field notes. Altogether, four cases were examined. Two of the cases, Openlab and Skylab, were primarily related to academic environment. One case, ABB Innovation Center, was related to a company and one case, the Service Center, was a public space related to a certain city.

## *4.1 Case 1: Openlab Stockholm*

**Overview**
The Openlab based in Stockholm, Sweden, is an open lab for co-creation. Their aim is to "solve society's future challenges in a radical and innovative way". Their motto is "Everyone is a student" and they follow the principle of "having the courage to Do first – Think – Do it again." (Openlab 2017a.) The role of Openlab is to facilitate activities (Björkman, 2017).

The Openlab premises contain reservable rooms such as multi-purpose hall for large auditions and conference and workshop rooms. Openlab also contains flexible working spaces, prototype studio Make and Open Café. Openlab offers education such as master's level, professional courses and workshops. They also host a variety of events, seminars and exhibitions. (Openlab 2017a.)

**History & implementation**
The founding partners of Openlab are City of Stockholm, Stockholm County Council, Stockholm County Administrative Board, Karolinska Institutet, Stockholm University, KTH Royal Institute of Technology (later KTH) and Södertörn University (Openlab, 2017b). The Openlab project was started with meetings between the city of Stockholm and KTH on how the two organizations could collaborate better. (Björkman, 2017.)

Despite the exchange of competence, there were some difficulties on getting to know each other and to know more about each other's processes. They visited other co-creation spaces during the implementation. They also used co-creation methods. Ivar Björkman had already previous experience of similar projects as the former president of Konstfack, a university college of arts, crafts and design in Sweden. They had a formal vision of Openlab from the beginning but it has changed and iterated during the years. (Björkman, 2017.)

They decided to start quickly and to get things going. They decided to keep it simple and proceed step by step. The first step was to start the master courses. They also started in a smaller space and after 1,5 years they moved to their present space. Starting in smaller place was found beneficial as they could iterate and learn more to make the plans for the eventual space. (Björkman, 2017.)

**Co-creation at Openlab**
The Openlab space has been designed to enable co-creation. They reach out to different people from different disciplines to get them involved in Openlab. (Björkman, 2017.) The stakeholders of Openlab consist of students, researchers, experts, end users, and staff from different organizations (Openlab 2017a). The mix of people at Openlab encourages

unexpected meetings and interfaces. One of the meeting places is kitchen where, for example, members' lunches are arranged. The co-working people can even take part on the masters' course. (Björkman, 2017.)

Openlab is a neutral platform and openness is expected from all Openlab users. There is an open mindset at Openlab and people are being let in the process. There are not much hierarchic structures at Openlab. The Openlab staff are all around the space. There are staff pictures on the wall so one knows who they can ask for help. The people must feel that it is good to be in there and that they are coming to their own place. They must feel that Openlab is for them. "Everyone is a student" at Openlab. (Björkman, 2017.)

**Reflection and further development**

At Openlab all the iterations are documented by means of taking pictures and videos. They tried out written reports at the beginning but that took too much time. In the end of each process good and bad feedback are collected. User involvement is encouraged and they get many suggestions from the users. (Björkman, 2017.)

The most successful aspect of Openlab is the people's general impression and the atmosphere of Openlab. People like that they are having lots of activities. The different things that are done at Openlab makes people curious and interested. The most difficult part is communication. Communication with large organizations is not easy. Perhaps more effort could have been put to communication between stakeholders in the beginning and how to involve the partner organizations. (Björkman, 2017.)

**Field notes**

The Openlab entrance is right next to the KTH main building. Openlab is situated on the old Rektorshuset building at KTH. Around the corner is a plaza. Around the other corner is a boulevard and bicycle parking. The metro stop is just around the corner.


**Figure 1.** Openlab is easily accessed by walking, biking or by metro around the corner.

The Open Café is operated by Lux restaurants. The café serves breakfast, lunch and snacks. Coat racks are available next to the door. People gather to work together in the café. There are tables of different sizes in the café and good lightning. Hit music on low volume is playing on the background. One corner of the café can be separated with a curtain. All the furniture is movable.

**Figure 2**. In addition to eating, group working is also a possibility at Open café.

On one wing is a conference center where a multipurpose hall, a conference room and four workshop rooms of varying size are situated. One room works as the Conference reception. The rooms have glass doors and windows to the corridor with adjustable curtains if privacy is needed. A TV can be borrowed from the corridor. The workshop rooms are equipped with whiteboards, and projectors are available on request. The multipurpose room is equipped with a projector, speakers, hearing loop and microphones and can seat up to 70 people (Openlab, 2017c).

Staircase hall is left clean and empty. There are only design lamps. One wall is all window providing natural light. The entrance to Openlab co-working space is on the 2nd floor. Member and student challenges are presented on the wall with the text “Do first, think, do it again…” in the co-working space. Reserved rooms are marked to the whiteboard. The Openlab staff, students and co-working members are introduced on another whiteboard.

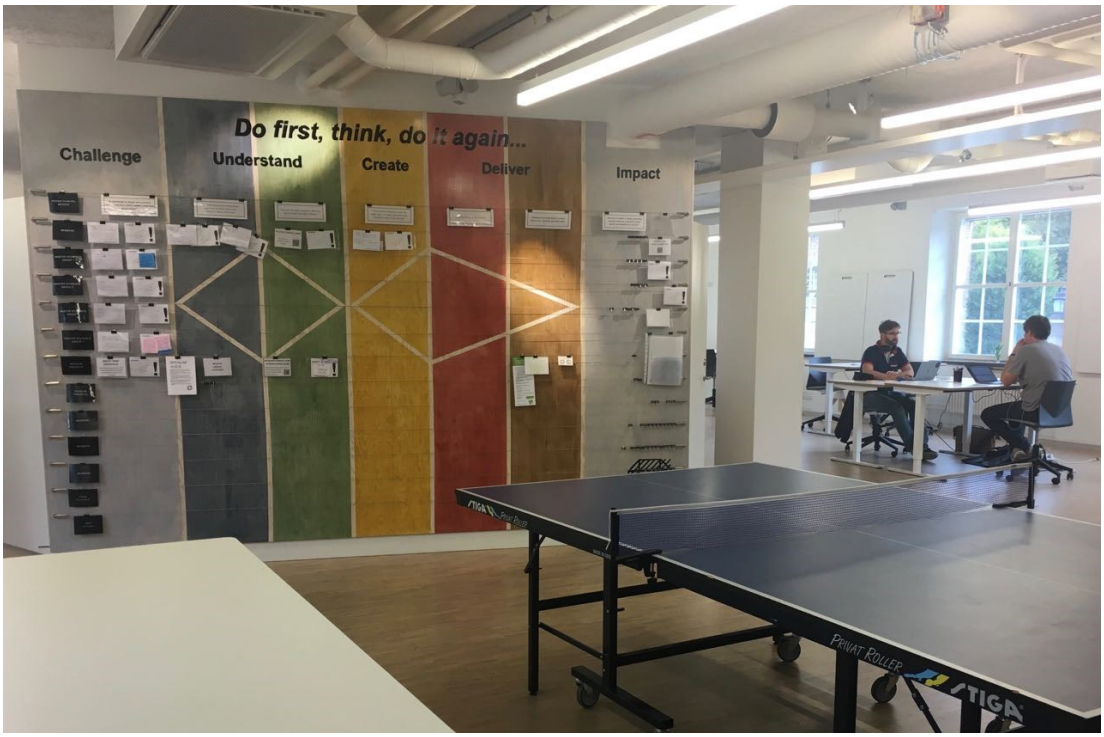


**Figure 3.** The challenge wall and ping-pong table at the co-working space.

**Figure 4.** Light colours are dominating at the Openlab's co-working space. Reservable rooms have indoor windows.

Reservable rooms for undisturbed work are on the center of the co-working space. All these rooms have glass windows. There are more coat racks in front of the reservable rooms. Lockers are available for personal items. There is also a table tennis table to use freely. There is a a lot of white and light wooden surfaces in the Openlab. There is also a lot of natural light in the co-working space. The Openlab is equipped with acoustic ceiling tiles. All the whiteboards in Openlab are movable.

**Figure 5.** The whiteboards can be moved around Openlab.

There is also a group-working room for students on the 2nd floor. Curtains can be used if more privacy is wanted. General and course information on the wall. Paper, markers and other material is provided.

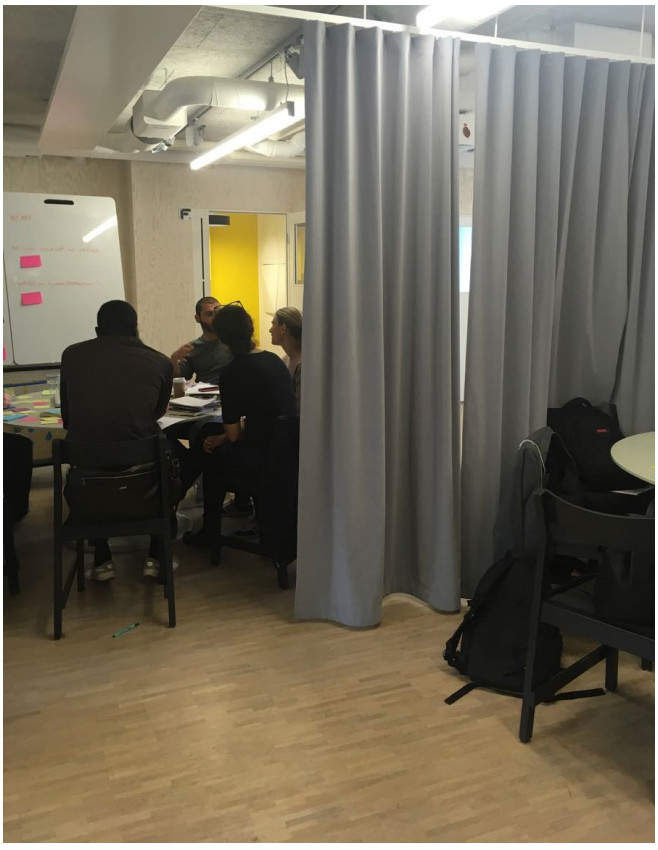

**Figure 6.** Curtains can be used to divide the students' group-working room.

The kitchen acts as a meeting place between students, members and staff. Recycling point and member mailbox are in the kitchen as well. Booking schedule and general information in the kitchen. Information spots are highlighted with lamps. The students get an access card to Openlab so they can use it 24/7. The Wi-Fi password is changed every week.

**Figure 7.** The kitchen acts as a meeting a place.

The Make workshop is situated in the basement. It is for people who need to build small prototypes for projects. There are tools and materials available. Also, flexible working space is provided. The workshop is equipped with 3D printer, large format printer, CNC mill, sewing machine, wood and metalworking tools, soldering station and paper crafting equipment. (Openlab, 2017d.) Make also has a small kitchen.

## 4.2 Case 2: Iso Omena Service Center

**Overview**
The Iso Omena Service Center ('Ison Omenan Palvelutori' in Finnish) is located in a shopping center in Espoo, Finland. It provides a variety of services for the resident of Espoo, such as a library, youth services, a maternity and child health clinic, a health center, laboratory and medical imaging services by the region hospital (HUS), mental health and substance abuse services, Social Insurance Institution (KELA), a citizen's services office, and a meeting place, Kohtaamo, for art and culture. The Service Center opened on 2016 after the extensive renovation of the Iso Omena Shopping Center. (Espoo 2017.)

The Service Center is a new service concept which brings together the separate public service units in one space. The concept enables easy access to public services for their customers, in this case, the city residents. The customers can use the services of several service units at the same visit. The combination of service units in one space also allows a more comprehensive fashion in addressing the needs of the resident. The location in a shopping center sets down a neutral base for the services. (Espoo 2017; Kenno 2017.)

**Stakeholders**
The different stakeholders at Iso Omena Service Center are the organization of the city of Espoo, the service units, local companies and organizations, educational institutions, other cities and the most importantly, the citizens of Espoo. One important stakeholder is the shopping center organization, Citycon, where the Service Center is physically located. The citizens of Espoo are primarily seen as the main customers of the Service Center and the stakeholders above all else. From the administration point of view, the different service units at the Service Center are independent. There are only one and a half people employed by the Service Center.

**Co-creation**
Co-creation is part of the strategy of the city of Espoo. Co-creation at Espoo means collaborative development towards a common goal set in advance. Espoo co-creates together with citizens, companies and organizations. Their view of co-creation is also strongly linked to learning; the objective is to learn as much as possible during the process. It is also important that evaluation goes along the process. The initiative to co-create could come from both the city of Espoo or from the needs of the companies. (Vihula 2017.)

Co-creation was not widely used during the initial development of the Service Center concept. However, service design was an important part of the process. After its establishment, the Service Center has been developed further with co-creative means. At the moment, the Service Center is on the phase of continuous development. New ways to develop the concept further are discovered constantly. (Vihula 2017.)

The goal of the co-creation at the Service Center is driven by the need to provide better services for their customers. Their functions and development are very customer-focused. They believe that new innovations can be developed by the means of collaboration. Espoo does not necessarily want to do everything alone but they want to be open for other service providers, such as the companies, when it is legally possible. The goal has been the same from the beginning. They market The Service Center as an innovation platform. (Vihula 2017.)

The concept of co-creation is still on its infancy at the Service Center. Some employees are still not aware of the definition of co-creation and who are participating the co-creation. Some of the service units are so busy that their employees have not had enough time to participate in co-creation. (Kenno 2017.) Some private companies also have difficulties in comprehending the whole concept of the Service Center as an innovation platform and they do not know what is possible there. (Vihula 2017.)

The spaces of the Service Center can be reserved for collaborative activity. The co-creation between the city and companies is not very agile yet. The employees of the service units are very tied to their daily tasks. This kind of collaboration demands beforehand planning and resource allocation. They also think a better relationship is gained if the co-creation process starts with a common understanding. (Vihula 2017).

The publicity of the Service Center has also caused some challenges for co-creation. Especially the private companies have been concerned about the safety of the customers. Also, some of the service units have a very strict policy on information security. This causes some restraints to collaboration and co-creation as some information cannot be shared. (Kenno 2017.)

Internal communication is difficult with this kind of diverse organization. Also, employees of some service units are too busy to participate in co-creation. However, the number of customers will be growing in the future. One solution could be closer collaboration with the educational institutes. (Vihula 2017.)

**The facilities**

The Service Center is easily accessible because of its public nature and location in a shopping center. The space is also physically open which promotes collaboration. The overall atmosphere is different to what is usually associated with public services. Because the unique concept the employees and customers of the Service Center have a different mindset on how to act at the Service Center. (Kenno 2017.)

The presence of customers is also very important for the companies. The customers come to the space after the services. They need not to be separately invited. The workshop room, Paja, next to the library allows prototyping. At the Service Center, it is also possible to get instant feedback from the customers in the pop-up space which is connected to the workshop. (Vihula 2017.) The pop-up space allows only testing, collaboration and co-creation activities. For example, marketing or other commercial activities are not permitted. The pop-up space is not a showroom. (Kenno 2017.)

There is also flexible working and performance spaces. For example, bigger events are possible to organize at the Stage. The bookshelves of the library are equipped with wheels so they are easily moved out of the way. In fact, all the furniture except for the screens is movable. However, all the adjustments should be made so that the customer service is not disturbed. (Vihula 2017.)

**Activities**

Several other activities are taking place in addition to the basic services provided at the Service Center. For instance, organizations can come and share advice with the citizens. Wide range of different events and lectures are organized. There are also culture events,

such as concerts. The library is one of the big organizers of such events. The customers won't necessarily expect these from the Service Center. (Vihula 2017.)

Documentation is mostly done by keeping a log of the events and activities at the Service Center. Participant lists, pictures and other materials are collected. Paper feedback is collected at the Service Center and the employees are encouraged to write down verbal feedback given by the customers. The city of Espoo also has an electric feedback portal. The managers go through the feedback in their own units. A customer satisfaction survey is arranged yearly. More allocated surveys for certain customer segments will be done next year in collaboration with the educational institutes. (Vihula 2017.)

**Reflection and further development**

The feedback has been mostly the same from the beginning. The overall reception has been positive. The customer satisfaction was over 90 percent in the last survey. The experience of the customers was that they benefit from the location of the Service Center in the shopping center. Their everyday actions are more streamlined. The customer service was also praised. However, some customers had difficulties to accept the new concept. For example, the openness of the medical center has been criticized. Doing things differently has been a huge challenge. It has also been demanding for the city to get accustomed as well. (Vihula 2017.)

Generally, the concept is working well on everyday level. The Service Center has succeeded best at generating the atmosphere and the customer service spirit. Both the customers and the staff value this. This would not be possible on this scale without the concept of the Service Center. Sometimes, the customers do not quite know how to act as they are new to the concept. It is also challenging to the staff because questions of the customers can be outside their core competence. At the Service Center, they have been able to turn even these cases to positive. (Vihula 2017.)

The strategy of Espoo is to scale the concept to other local city centers of Espoo. They are not copying the concept as it is, rather it is altered to answer to the individual needs in these locations. But the concentration of services and location in shopping center has seen as giving clear benefits to the citizens. (Vihula 2017.)

**Field notes**

**Figure 8.** An easy way to the Service Center is by escalators. Note also the light instalments on the roof.

The Service Center is located on the top floor of the shopping centre. It is easily accessed from the shopping center by escalators or elevator. The Service Center occupies the whole floor. The information desk is right at the top of the escalators. There is also a map and a green line that leads to the medical center.

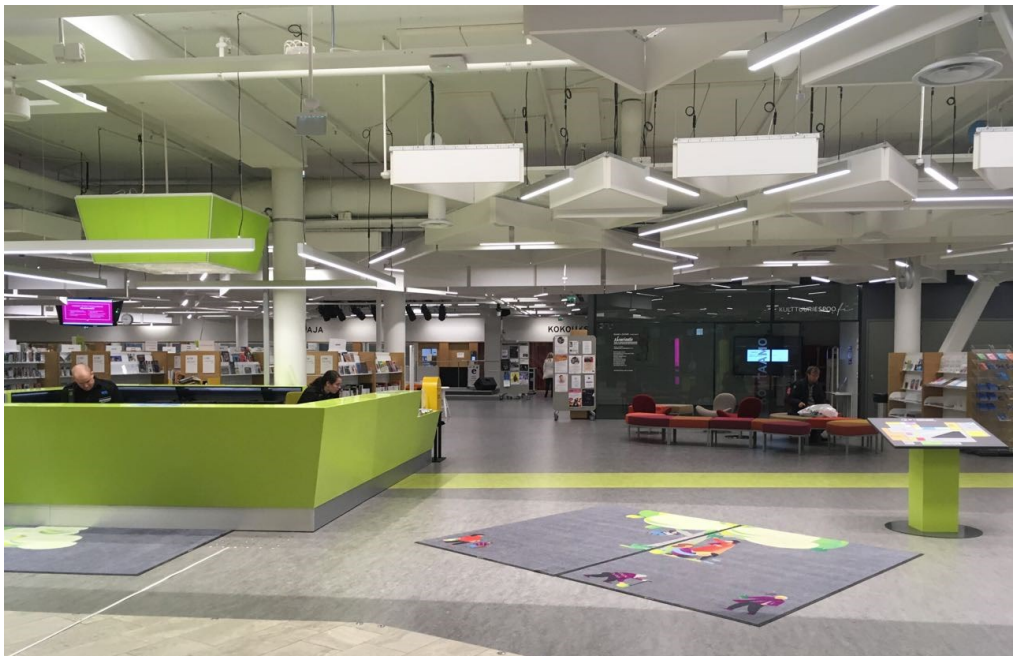

**Figure 9.** The information desk is encountered first at the Service Center.


**Figure 10**. Maps are provided on few different points at the Service Center.

The roof has prominent light instalments. There are also acoustic panels attached to ceiling. Light colours with brighter accent colours are favoured in the interior design. Green is most used to highlight informative structures and other objects, such as electric plugs, related to the Service Center.


**Figure 11.** There are combined lounge and waiting areas.

The library has extended all over the Service Center. The magazines are provided by the library and can also be loaned. The other service units do not have to provide magazines of their own for the waiting customers. The maternity and child health clinic is located next to the to the children's department of the library which makes it possible to share the children's playground between the two.


**Figure 12.** The library and maternity and child health clinic share the playground.

Large windows provide natural light for the waiting area. Informative screens are provided to show bus timetables or queuing schedule and time estimations.


**Figure 13.** Magazines for the waiting and lounge areas are provided by the library. The shelves have wheels for moving. The green mark on the floor leads back to the information desk.

## 4.3 Case 3: ABB Innovation Center

**Overview**
ABB's Innovation Center is located at the ABB Pitäjänmäki Factory in Helsinki. Next to the Innovation Center is ABB Collaborative Operations Center which is basically a remote customer service center. The ABB Digital organization has been established to accelerate and support digitalization at ABB globally. (Alamäki & Mäkelä 2017.)

Traditionally, there has not been much coordination or general view of customer innovation or showrooms between the ABB business units of different countries. One initiative at the ABB Digital has been to establish a global network of co-creative spaces which are called Ability Customer Experience (ACE) centers. In ACE centers, there is also the digital space in addition to the physical space. Ability is a trademark for ABB's digital services so there is an emphasis on digitalization. They visited companies in the USA, mainly on IT sector, and their co-creation spaces. The most important lesson has been the 3 P's; people, process and place. The goal of the network is to align these in different countries and to produce supporting material. (Alamäki & Mäkelä 2017.)

**Background**
The process is leaning towards design thinking. First, there is a regular meeting with the customer for introduction. This is followed by a value network where the customer is genuinely listened to, their needs are understood and their problem is framed. For example, there might already be a ready solution under the ABB Ability. Sometimes, the customer is confused what digitalization means to them. (If necessary,) the value workshop is followed by a design sprint in the co-creation space. The design sprints follow the 5-day intensive design sprint concept by Google. A small team is focused on the problem of the customer. The customer or their representative can be involved. The outcome of the design sprint is an iterative mock-up or a prototype of the solution, which can be used for validation and collecting feedback. There should be enough space for this in the co-creation space. (Alamäki & Mäkelä 2017.)

**Goals**
The ultimate goal of the Innovation Center is to increase sales. The achieved by gaining a better understanding of the customer. If the customer can be offered something truly rational/smart and valuable it will also enhance the success of ABB and increase their revenue. The customer solutions are found faster and the hit rate will be better. Also, a better communication with ABB's salespersons. The silo effect is present in an organization this large. Not all salespersons know all the ABB products either. The total offering and the customer opportunities could be seen more holistically. The decision-making will also be faster. (Alamäki & Mäkelä 2017.)

**Stakeholders**
The most important stakeholders are the customers, the local business units of ABB, the global product managers and the ACE network. Best cooperation with the customer is achieved if both R&D and sales units are present. They all have quite different points of view. The customers usually value the presence of R&D people. The Innovation Center is not open for anyone. They want to keep a balance between the customers and ABB personnel present. That the customers are not badly outnumbered. The key people who have a connection to the customer are welcomed. (Alamäki & Mäkelä 2017.)

The Innovation Center functions a bit like s small start-up inside ABB. They don't want to be seen as a part of a specific business unit. The Innovation Center should be accessible by all units. The most important message has been that the Innovation Center is shared by everyone. Also, Digital ABB has been established to serve all units. The Innovation Center is also good for improving internal processes. The customer is put in the center of everything. More people can be directly in contact with the customer and hear their insight. (Alamäki & Mäkelä 2017.)

**Development**

The Innovation Center is still in progress. The recruitment of a service designer was ongoing during the time of the interview. A small renovation and interior design were incoming. Co-creative means have not been used in the implementation of the Innovation Center. There have been some aspects of user-center design, as the main developers of the space shall also be its users; what there needs to be in order to facilitate properly. (Alamäki & Mäkelä 2017.)

There already is a view of what the space should be. The co-creation space should be functional. There should be enough wall space for visual material for facilitation. The space itself should be different than the normal working space. People will get a feeling already when entering the space that something different will happen here. Their attitudes are different from the beginning. It is not that serious here, one can openly tell their ideas. The space communicates that now they are doing front-end creative activities. It is part of the entity. (Alamäki & Mäkelä 2017.)

The co-creation space cannot be a showroom. There should not be a strong brand message but they want to express their competence. The co-creation space is a creative space and therefore marketing should be forgotten. The space should be neutral and open to support ideation and discussion. (Alamäki & Mäkelä 2017.)

Information should be visible for all, for example, with smartboards or whiteboards. There should be also tools to make processes visible. Basic equipment for workshop facilitation should be included. They want that people are primarily standing and not sitting down. This will be supported with standing desks and bar chairs. There should be movement and dynamics in the space. The space is not a lifesaver if the facilitator or facilitation methods are not working properly. They mention three P's; People, Process and Place. People are most important, then process and lastly the place. Walls do not generate creativity but support it. (Alamäki & Mäkelä 2017.)

The main activities in the Innovation space will be the workshops and design sprints. There will also be information gathering, customer insight and analysis. Furthermore, the possibility to demonstrate, for example ABB's products, is important. (Alamäki & Mäkelä 2017.)

There is not yet a model for collecting feedback. Actions will speak for themselves: if the customers want to come back again, if the activities in Innovation Center leads to a deal. It should be followed up more closely. If participation has helped decision making. They would like part of the flow; a part of the sales process and not a distinct place for occasional visits. (Alamäki & Mäkelä 2017.)

It is important to market and promote the space internally, especially in a big organization like ABB. But one must be careful that people don't get too excited before the process is

ready. Word-of-mouth has been noted to work sufficiently. At this point, faith is put on those who are interested and proactive. When the process is ready, internal news and articles are also a good information channels. Hosting open-door events is also a good way to attract people. Little by little the information will reach people. (Alamäki & Mäkelä 2017.)

## 4.4 Case 4: DTU Skylab

**Overview**
DTU Skylab is an interdisciplinary hub and community supporting student innovation and entrepreneurship. It is located on the main Lyngby campus of the Technical University of Denmark (Danmarks Tekniske Universitetet, DTU). (DTU Skylab 2017a.)

At Skylab, theory is connected with the real word. They connect students with companies on both, public and private sectors. They also build bridges between student innovation and the academic world. Their motto is "think big, fail fast". The students are empowered to "think big, fail fast and then scale quicker." (DTU Skylab 2017a.)

**Activities**
There are three equally important focus areas at Skylab; the start-ups, academia and real world projects. The start-ups are supported with coaching on different technological, business and financial aspects. The workshops enable prototyping for developing and testing the ideas. They can get feedback from peers or professionals at Skylab. The academia contains collaboration with the teachers and researchers at DTU. They can organize their courses at Skylab. The workshops allow the combination of lecturing and practical learning. The real-world problems can be, for example, case competitions and product development projects with the collaboration external organizations, companies and start-up businesses. (DTU Skylab 2017b)

**History**
The prototype version of Skylab opened on early 2013. They started with a small team in a temporary location, premises they knew were to be torn down in future. The strategy was to start quickly and learn by their mistakes during the process. They spent that time in an agile manner, testing out different concepts, activities, strategic partnerships, facilitation and so on. After a year of successfully testing the concept, the DTU Skylab officially opened in September 2014. (DTU Skylab 2017c; Sørensen 2017.)

Mikkel Sørensen, the Head of DTU Skylab, has been with the project from the beginning. He had already experience on working with supporting and building start-ups. One inspiration for the Skylab was the Design Factory and Start-up Sauna at the Aalto University. The president of DTU, Anders Bjarklev, had visited the Design Factory and wanted to see if it would be possible to establish DTU's version of such places. Also, other places were, and still are, visited for inspiration. (Sørensen 2017.)

**Mindset**
Despite the scaling up of the Skylab, the mindset and the approach has been the same from the beginning. They are still strongly believing in doing things in real life, testing it and learning from it. They strongly believe in people. Skylab is centered around people and not technology, even though it is a place for technology. Committing and engaging their users has always been in the very heart of Skylab. (Sørensen 2017.)

**Goal**
The goal of the Skylab is twofold. From the educational perspective, they are driving learning as they want to create better and more experienced engineers and graduates. They are also driving innovation as they want to get new technology out in the world. It is difficult to measure the impact of their effort as the Skylab has only existed for three years. However, the implications are pretty good. The users value being in there so they

rank it quite high. External collaborators like external companies are also very interested in getting in contact with their students. They are doing their first impact analysis of all DTU start-ups next year. (Sørensen 2017.)

**Co-creation enablers**

Their focus point is in the interdisciplinarity and diversity. It is very important part of the co-creation for Skylab. They have very strong academic environments. They also bring experienced people from the outside. Skylab is a place where all these competencies, all these people they put under one roof. The users value highly the ability to meet people they wouldn't have met otherwise. For Skylab, co-creation is also closely linked to the mindset of having the courage to fail. (Sørensen 2017.)

The agility and flexibility are enablers for co-creation. They receive many unexpected requests and they see it important to answer them. Instead of a static house, they opted for a living organism that is able to adapt to unknown future needs of its users. They strive for the unexpected. (Sørensen 2017.)

Physically, Skylab is a very transparent place. Even the workshops are transparent. When walking into center of Skylab action, such as 3D printer in workshops or people in the meeting room, is seen instantly. It was very important for them that the space is not too divided into specific areas. (Sørensen 2017.)

**The facilities**

The facilities consist of open and closed office spaces, meeting rooms, prototyping workshops and teaching facilities. There are also social spaces and events spaces, such as the auditorium. The rooms are functional. For example, the tables of auditorium are equipped with wheels so they can be arranged on multiple ways. The auditorium can also be extended into open space with seats for 200 people. (DTU Skylab 2017b)

Openness and transparency are highlighted. They see it important that people can meet and start working together. The facility has been designed to force interaction as there are no divisions to smaller offices and all the workshops have glass facades. (Sørensen 2017.) All DTU students have free and around-the-clock access to Skylab office facilities but the workshops have opening hours (DTU Skylab 2017d). The skilled workshop crew can assist the students in their projects (DTU Skylab 2017e).

There is also flexibility as the furniture can be moved around and there are some stretching walls. The head of Skylab, Mikkel Sørensen has stated that they are a “Living organism able to adapt to the surrounding world”. There is also roughness at Skylab. Despite the nice furniture, the space is not too polished. This give as impression of Skylab as a place where failing is not punished for. The users have permission to use the facilities as they wish. This is seen to encourage responsibility of the users. (Kohlert & Cooper 2017)

**Stakeholders**

Their most important stakeholders are the users of Skylab who are mainly students. Also, the faculties and management of DTU are important stakeholders. Other stakeholders are external companies and organizations, the start-up support ecosystem, and international collaborators. At the moment, they are in the process of expanding the Skylab to include researchers and more external collaboration. The expansion also allows them to have

more complex technology and research projects. However, their focus will still be in the students. (Sørensen 2017.)

**Feedback & development**
Skylab is collecting feedback on various ways. They have a PhD student who has been collecting data from both faculty and students and doing surveys. They also have a satisfaction survey on the workshops. They collect data on the satisfaction level, and what the users find most meaningful and helpful at Skylab. (Sørensen 2017.)

The Skylab do not have very strict KPI's. However, they measure a lot of things so they can set up internal targets themselves. They pursue ideas whenever an opportunity rises. They are curious to see what happens. If something does not work, they will stop it and they will survive. It is very important to them that they don't let themselves to be controlled by KPI's or such. (Sørensen 2017.)

One of the great challenges has been going from a very small project to a bigger one which gets a lot of attention. The Skylab has grown quite much during the years. It is challenging to scale up and keep their agile, informal and unbureaucratic structure as they think these aspects are significant causes to their succession.

According to Sørensen (2017), one the things Skylab has best succeeded is creating an identity. He said, “I think there is some kind of identity around this place which hopefully builds some of the values (…) like "just do it, but fail fast", building collaboration, diversity… All these kind of things. Creating some kind of identity around the place which is the one that can then help to push the start-ups forwards, create the right network around start-ups. That is probably the one thing I'm most proud of. Sometimes people call the community or the mindset. But I think, in the end, it’s an identity.”

**Field notes**
The lobby area of Skylab is very open. From the lobby is clear view to the auditorium, kitchen and some of the workshops. There are huge tree-shaped indoor plants. There is a floating cubicle called Skybox which works as one big or two smaller meeting rooms.

**Figure 14.** The lobby area (left) is very open. Individual work is possible at the balcony (right).

Workspace for individual work and the open office of the staff are located on the balcony. There is also a “Wall of Fame” at the balcony where newspaper articles of Skylab are collected. Different shades of grey with some accent color are favored. There is also a variety of different textures in the interior of Skylab.


**Figure 15.** The Wall of Fame (left) and working space (right) on the balcony.

The meeting rooms have glass facades. Curtains can be used if more privacy is wanted.


**Figure 16.** One of the meeting rooms with glass facade and curtains (left). Note on the kitchen (right).

Orange is used to highlight the official messages and notes by Skylab. Different kinds of notes are used to assist the users. At the front door and at the door of the metal workshop are bright orange floor stickers welcoming people and giving them instructions at the same time.

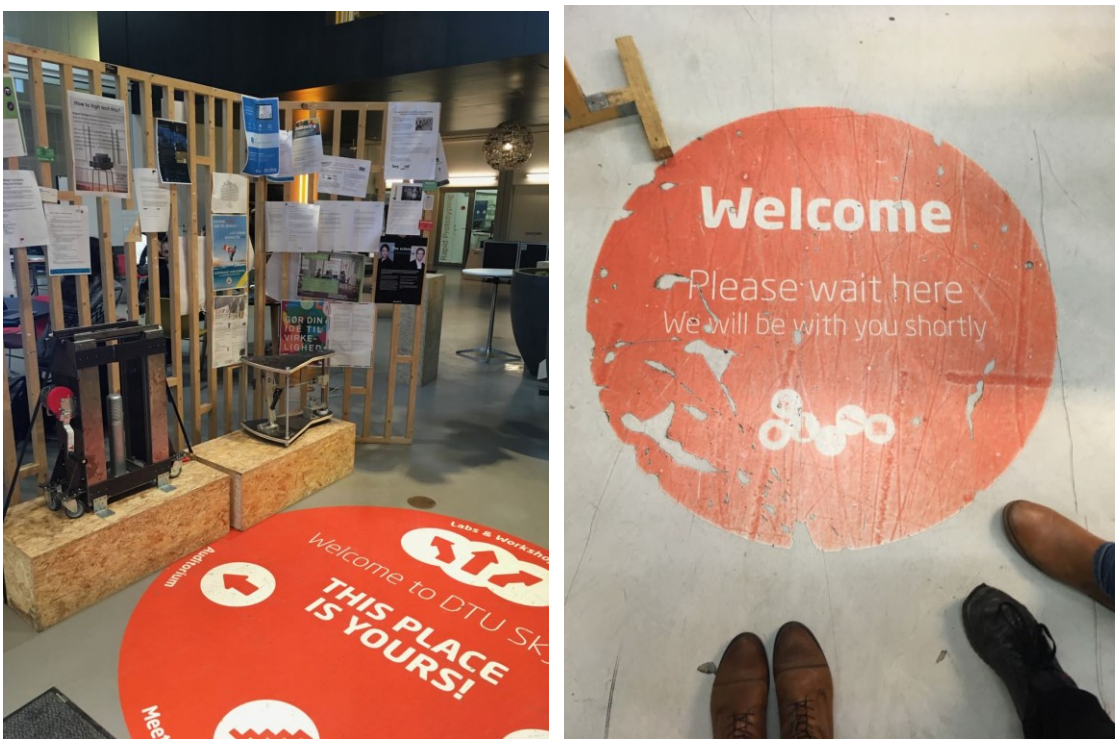


**Figure 17.** Informative floor stickers at the front door and on the metal workshop.

There are indoor plants at the workshops as well. One of the workshops was decorated with a palm tree, surfing boards and decorative lights.

**Figure 18.** Plants at the workshop room (left) and more exotic decorations in another.

# 5 Findings

The results are based on personal interviews and field notes taken during the visits. The results are grouped under recurrent themes.

## *5.1 Stakeholders*

There are multiple stakeholders involved in all the cases. At ABB Innovation Center and the Espoo Service Center customers were raised above all. At Skylab, the main stakeholders were the students. At Openlab, the stakeholders seemed to be of equal importance. All the spaces included internal and external stakeholders. Some of the stakeholders, such as the internal employees or financers, were an integral part of the space and some could be chosen to be included, such as external organizations.

## *5.2 Goals*

In all the cases, the space had an established goal. The goal of Openlab is to solve future problems with co-creative means. The goal of the Service Center is to provide better services to the citizens of Espoo. The goal of ABB Innovation Center is to increase sales by better understanding of the customer. Finally, the goal of Skylab is to generate better technology and more experienced graduates by driving learning and innovation.

In all cases, the goals had remained the same from the very beginning. The goals also determined how the spaces functioned and what actions they provided. They did not have strict limitations regarding the actions that take place in their premises so long as they were linked to the goals of the space. It is notable how different these are from one another. The goals seemed to be unique to the very space.

## *5.3 Openness, accessibility and neutrality*

One recurrent theme was openness. Both physical and mental openness were mentioned on several occasions. There were a lot of open space in the visited spaces. Dividing walls were avoided and when walls were needed, the wall material was usually glass which provides at least a visual connection. At Openlab, curtains were used to divide the spaces if necessary. The ABB's Innovation Centre basically consisted of only one room but it too had one glass wall to the corridor. All the locations also had plenty of natural light.

Openness in a more mental sense also surfaced. The Skylab, the Service Center and the Openlab's café had open doors for occasional visitors. In fact, the Service Center does not have a door at all. Openness in the sense of socialization and sharing is also expected from users at Skylab and Openlab. Another theme related to openness was accessibility. This was especially highlighted at the Service Center because of its public nature. The Service Center is located in the top floor of the Iso Omena shopping center. the shopping center is easily accessible with public transport as there is a metro station and upcoming bus terminal. There is also an expansive parking lot for those arriving with their own car. Openlab is also easily accessible as it is located right next to the metro station on the KTH campus in Stockholm. Bicycle racks are provided for those who prefer to cycle.

Innovation Center is located at the closed factory area which naturally reduces the amount of occasional visiting. However, they wanted their space to be neutral so that it would not be limited to a business unit or a certain segment of employees or customers. In addition to openness and accessibility, neutrality was also embraced in all the cases. The openness, accessibility, neutrality we all seen as positive aspects and limitations and restrictions as negative aspects by the interviewees.

## 5.4 Spatial aspects

Several spatial themes also recurred as the co-creation spaces visited were of physical nature. One of the most emphasized elements was flexibility. The spaces were designed to enable different kind of activities and the interaction of multiple stakeholders. At Skylab and Openlab, the ability to answer to sudden needs and to host unexpected activity were specifically mentioned. At Skylab and ABB Innovation Center, agility was also strived for.

There are multiple ways of addressing flexibility in action. Integrated furniture was avoided in all cases. Also, added wheels enabled the easy movement of furniture, for example, library bookshelves at the Service Center and group work tables at the Skylab. This also gave also a message to the users that rearranging the furniture is possible and allowed. However, in most cases the whiteboards, screens and other presentation tools were fixed. At Openlab, the whiteboards were movable. They were smaller in size that they could be easily carried and there were matching hooks all around the place for them.

As discussed in the previous section, there were lots of open space in the case examples. If a more private and intimate space were needed, there were movable partition walls at Skylab and thick curtains for dividing the space at Openlab. Some meeting rooms with glass walls also had curtains at Skylab and Openlab. At the Service Center, movable free-standing partition screens were used. The screens were low so that adults can see over them but they still provided some privacy.

Visual aspects were a strong part of the spaces as well. All the spaces, except ABB Innovation Center had some kind of visual identity. There were recurring color and texture schemes. At the Service Center, light green was used as a highlight color, for instance for the information desk and signposts. At Skylab, orange was used to highlight official notes and signs. Both of these colors were bright and easy to notice for the first-time visitor. The spaces also had an appointed font in their written communication. Skylab had lots of house plants. There were bigger trees in the big lobby area right next to the entrance. There were plants all over the place from the office are to the workshops.

All the spaces had much natural light. Where the natural light was insufficient, it was filled in with modern lights. There were efficient working lights also at the workshop facilities. At the Skylab, there were even some seasonal Christmas lights installed for atmospheric purposes. There were design lights at the otherwise quite bare stairway at Openlab. At the Service Center, the lights in the ceiling was organized in a geometrical fashion thus making the necessary part of the infrastructure a visually pleasing element. Acoustics were also given though. At Openlab and Service Center, there were also acoustic panels attached to ceiling. The noisy workshop areas were also put behind doors in all cases. Phone booths were provided at Skylab.

The basic needs of the users were taken into consideration. Skylab and Openlab had their own kitchens. Although, the space of ABB Innovation Center was under construction, there was already a distinctive red refrigerator. Several toilets were available in all cases. There were also lockers for personal possessions at Skylab, Openlab and Service Center. Plugs were available for charging electrical appliances. At Service Center, plug stations were provided at the waiting and library area and they were marked with the green highlight color. There were some kind of presentation tools, such as screens, projector or whiteboard, in all meeting rooms. Suitable event technology, such as microphones and loudspeakers, were provided as well.

Objects of irregularity and randomness were also present in the spaces. There were unexpected things in unexpected places. At Openlab, there was a ping-pong table and a bicycle in the co-working space. At Skylab, there was a palm tree and surfing board in one of the workshop rooms. There were also trees in huge pots at the lobby area and Christmas lights in metal workshop. At ABB Innovation Center, there was already a striking red refrigerator although the interior design was incomplete. At the Service Center, there was some odd-shaped furniture. Bright colors were occasionally used. Openlab, Skylab and the Service Center also included various different materials in the interior and furniture.

## *5.5 Informative and communicating space*

Related information was visible to the users in several different ways. General information and instructions were scattered in relevant spots at Skylab, Openlab and Service Center. For instance, instructions regarding the workshop was placed on the spot. Room names and functions were written on the doors. There were several information screens at Skylab and Service Center. At Skylab, there were large informative stickers on the floor when entering the building or the mechanical workshop.

There were also bulletin boards or walls dedicated for certain information. For example, at Skylab, there was a bulletin board for events and other timely notes and a “Wall of Fame” where newspaper articles of Skylab were collected. At Openlab, there was a dedicated wall for the current student challenges at Openlab. At Openlab, the pictures and titles of staff members and students were presented on two movable whiteboards. At Skylab, the pictures of the workshop staff were presented right when entering the workshop facilities.

The information provided at Skylab and Openlab was mainly in English. At Service Center, the information was in Finnish, Swedish and English. At Service Center, some signs were also in braille. In general, the information followed the overall visual identity of the space. There was also non-verbal information. For example, at the workshops of Openlab and Skylab, the shapes of tools were painted on the walls so users know where to return them after use. Previously crafted prototypes and objects were also presented for inspiration at Skylab and the Service Center’s Paja.

## 5.6 Attracting the people / users

People were attracted to the places in various means. At Openlab there is a café called "Open café" which is, as the name suggests, open for everyone. The café's signs outside induce passers-by. People are attracted to the Service Center by providing a diverse set of services, from health care to library. In fact, all the spaces provide some kind of services for their users, from providing working spaces to different activities and events.

Food and other beverages seems to be good way to attracting people. Openlab has the Open café which serves also lunch. There are also two kitchens for the users. The Service Center also has a café. Skylab has a kitchen for its users and ABB Innovation Centre had the refrigerator. The users do not have to leave to premises if they go thirsty and hungry. There is also lounge areas for relaxing and leisure.

## 5.7 Constant Development

The Openlab and Skylab had both started with a smaller prototype space. Processes and activities were tested in smaller scale before scaling up moving to the present space. Skylab was in process of scaling up again as they were planning the future extension of the space. None of the spaces regarded themselves as ready. Constant development was part of their way of working.

The development of the spaces seemed to be based on their leader's expertise. The current leaders of Skylab and Openlab had been with the project from beginning. Of course, the development was not entrusted for the leaders alone but their significance seemed noteworthy.

# 6 Discussion

In this chapter, common and differing aspects are noted between the different cases and compared to the findings of the literature review. Also, limitations of the study are discussed.

## *6.1 Ambiguous definitions*

One challenge was the **differing definitions of co-creation**. There seemed not to be one established definition yet. The elementary definition of co-creation as collective creativity can also be applied to cover great many different actions.

Translation of the term co-creation further confused the terminology. The literal Finnish translation of co-create would be 'yhteisluominen'. However, this is not much used. The most common Finnish translation for co-creation is 'yhteiskehittäminen' or 'yhteiskehittely' which basically means co-development. Although they are used synonymously with co-creation the terms can develop slightly different associations in Finnish speakers. The Swedish term 'medskapande' and Danish 'samskabelse' or 'medskabelse' are more in line with the English term.

Because of the ambiguous nature of co-creation, **it should be ensured that all the involved stakeholders have the same understanding of what is the meaning of co-creation in this particular co-creation space.** Otherwise, it could be difficult to get the people to really collaborate and create together.

## *6.2 Initiative forces*

The initial setting describes the most relevant factors in beginning of the development process of a co-creation space. By focusing on this phase a few factors attract attention. This could give insight on what should be considered before launching a co-creation space and what factors the developers have or have not influence over. Also, it could be beneficial to consider the causalities between the factors.

First, in all cases, there was a certain **goal or objective for the space**. The goal seemed to be very clear from the beginning. The set goals could guide the development of the space, and later, all the actions at the space. Therefore, it could be of utmost importance to focus on setting the goals in very beginning and return to them from time to time. However, this notion would need further studies as this thesis does not provide examples of what could happens to spaces with ambiguous or lacking goals. **The goals were also effectively exposed and notified to the stakeholders.** This is remarkably important with co-creation space where people are invited to interact with each other and the space itself.

Another prominent factor was the importance of the people. The notion emerged from the very definition of co-creation as a collective process. **The goals seemed to link to the associated stakeholders.** At the Service Center and Skylab, for example, the goal in simplified terms was to provide services for one or several group of their stakeholders. Some of the stakeholders were unavoidable, such as the administrative or financing units which enable the existing of the co-creation space. In some cases, there was a freedom to

choose which stakeholder group to collaborate with. As seen on the Skylab case, involving more stakeholder groups in later when the space is already established is not impossible. However, it seemed that **the involvement of each stakeholder groups should be a conscious decision**.

Then there is naturally the physical space. In some cases, such as in the case of ABB Innovation Center and Openlab, the existence of a possible space suitable for co-creation was one of the initiative forces of the development process. Stabilizing the location of the space early could naturally affect the development process of the space. In some cases, the space was designed and built according to certain needs of the particular case. These differences would be justified to be examined further. However, **the space whether it was present from the very beginning or built later, plays a huge part in the development process.**

**The causality between different factors is difficult to define.** The goal can have an effect on which stakeholders are included. On the other hand, answering the needs of the stakeholders could define the goal. Extending the study to cover more cases would perhaps provide more possible initiative factors. However, **the goal, the stakeholders and the space are among the first things to considered** when launching the development of a co-creation space.

## *6.3 Comparing the cases with the literature*

First, it should be noted that the development of ABB Innovation Center was still in progress which made it difficult to compare the physical space to the other cases.

**The physical space seemed to act as a medium for co-creation**. In the cases, the space was used to promote such factors as openness, flexibility, neutrality, collaboration and unexpectedness. When new people arrive at the space they are given hints of what is happening even before they meet anyone. The hints can be obvious such as putting a sticker that says “Welcome! This place is yours!” as was done at DTU Skylab. Some hints are more ambiguous. For example, flexibility as freedom to change the space could be hinted with attaching wheels on the furniture. Or, favoring open working space over small individual spaces hints that group work and collaboration are more desirable ways of working.

As already noted in the literature review, Oksanen and Ståhle (2013) have pointed out that the innovative space should reflect the values of its parent organization. The phenomenon was identifiable on the case studies as well. The values of the parent organization were present but perhaps not the values that were highlighted the most. In the case study, it was **the values that derived from the goal of the space that were most reflected by the space.** In addition, Oksanen and Ståhle (2013) present that values related to innovation, such as openness and collaboration, have begun to converge with values related to creative and innovative spaces.

The notion of networking was also present in all cases. None of the spaces were developed without visits to other spaces. There were aspects of collaboration on many levels. Visits from various external organizations were common at Openlab, Skylab and the Service Center. They all were keen to share their own discoveries and learn from others during

the process. Thus, **values such as openness, collaboration and sharing should not only be exercised internally but also externally.**

**Flexibility** of the space was also highlighted in the case study. The space should support various ways of working, with the focus on collaborative methods. There should also be possibilities to convert and adjust the space according to the needs of the users. The spaces of the case study were **designed to enable different kind of activities and the interaction of multiple stakeholders.** There are multiple ways of addressing flexibility in action, for example with movable furniture. Oksanen and Ståhle (2013) stated that modifiability of an innovative space is essential. According to them, modifiable spaces can change in response to the needs of their users, serve in various situations and offer opportunities for the users to act differently and innovatively.

**The space should attract people** to the space as co-creation is dependent on them. The people can be attracted by offering various kind of services, such as free working space or having a café on the premises. Providing these services could communicate to the users that it is acceptable and desirable to pass time at the space. It was also noted by Oksanen and Ståhle (2013) that innovative space should be attractive. In addition, of the fundamentals for collaboration space by Wycoff and Snead (1999) was abundance.

It was common for all spaces that there were workshop facilities in or near all the spaces. Openlab, the Service Center and Skylab had their own workshop premises and ABB Innovation Center was located next to their factory. The intention to be able to build **tangible prototypes and other physical presentations** was common for all cases. This notion is also backed up by the literature. Sanders and Stappers (2012, p. 57) and Aalto Design Factory (2017, p. 18) both implicated that tangible objects can stimulate creativity, innovation and ideation. Also, one type of creative space identified by Thoring et al. (2012a) was the Tinkering space that allowed experimentation and building things. In their typology one of the activities of Tinkering space was stimulating the users in a creative way.

In the cases of Openlab and Skylab, a temporary prototype space was first generated to develop and test their concepts. This procedure could also be described as experimental development. It was particularly dominant at Skylab. It could be beneficial to clarify if this kind of method is more prominent particularly in educational contexts. The co-create space as a pop-up space was not much represented on case study or literature. However, **as temporary spaces were used in the initial phases of the co-creation space development, the pop-up concept could be effective on testing how co-creation could be best established in a particular case.** Pop-up co-creation spaces could be seen as experimentation-driven development of the co-creation spaces. After a co-creation space has been launched and has functioned some time it could be measured with the 6T model by Nenonen and Kojo (2014). The model can also be applied in designing and developing user-centered workplaces, such as co-creation spaces.

The spaces were constantly development further. **None of the spaces were regarded as ready.** The users were always listened as part of the development process. Using co-creation methods in the development of the co-creation space could lead to better design. As the development of the spaces seemed to be based on their leader's expertise, it could also be interesting to study further how substantial effect the leaders have on the project in general.

Experiences was one prominent aspect which surfaced from the literature review. Experiences nevertheless did not reserve such high valuation in the case study. At the Service Center and ABB Innovation Center, the customer experience was an important factor as their most important stakeholders were the customers. It could also be that experiences processed in a more tacit and indirect way in the cases. In such case, it would need more deep investigations to bring them forward.

## 6.4 Limitations

The framing of the thesis was difficult in the beginning as it was difficult to get a general view of co-creation spaces based on the literature. Framing the topic more strictly to a more generalized view could have been reached. However, the initial goal of the thesis was to gain a broader view of co-creation spaces in different design, technology or business contexts. Focusing on one matter could obscure the general view. Thus, a more precise focus could have impeded the achievement of this goal.

The most prominent limitation of the thesis is that the results of the case studies are not universal. Generalizations cannot be made based on multiple case study of this scale. For that, more extensive case studies are required. Only four cases were conducted mostly because of the notably tight time schedule of the implementation of the thesis. The case study however provided varying perspectives on the topic.

Slight variation in the definitions of co-creation was noted during the case studies. It would have been interesting to see whether or not the slightly different views on co-creation effect their exercising co-creation. This aspect could have been put slightly more importance to line the results better.

The method of interviewing has also its limitations. The results of the interview are quite case-sensitive. The results are based on the experiences and views of the interviewees. The semi-structured interview give space for the interviewees to emphasize such notions that they find the most significant and relevant. For drawing more lined results from the interviews it would perhaps been relevant to conduct two rounds of interviews. Therefore, all aspects could have been covered more equally.

# 7 Conclusion

The goal of the thesis was to give a clearer view on what are the necessary and desirable aspects of a functioning co-creation space. The topic of the thesis was limited to cover the physical spaces for co-creation. The research questions were framed in the following way:

1. Why to co-create and what enables co-creation?
2. How the space can enable co-creation?

First, the theoretical background was mapped in the literature review. The literature review was divided in four parts: the definition of co-creation, the enablers of co-creation, the building blocks of co-creation space, and examples of spaces with co-creation elements. Literary works on fields of design literature, and business and marketing were the primary literature sources in the review.

The literature review was supported with the multiple case study to gain a deeper insight on the subject. Altogether, four cases were examined. The cases were selected to represent the diversity of co-creation spaces. This gave a more comprehensive understanding of the co-creation spaces. Aalto Design Factory was consciously excluded from cases as the point of the thesis was to seek new perspectives on co-creation spaces.

The analysis of the results of the case study were conducted based on the transcribed interviews and field notes. The results were grouped under recurrent themes and then compared with each other. Common and differing aspects were noted between the different cases and to the findings of the literature review.

The “Why to co-create?” part of the first research question was primarily answered in the literature. Collective methods of creativity, such as co-creation, are needed to resolve the new complex problems known as wicked problems. A more diverse view and a better foundation for development could be obtained in organizations by taking full advantage of its workforce in collaborative means. It was also noted that co-creation could enhance the value created for the co-creating individuals and companies as well.

The second part of the first research question was “What enables co-creation?”. Four important factors were found on literature. These were stakeholders, experiences, physical space and facilitation. Based on the case study, several factors that could enable co-creation were identified. First, the co-creation requires a goal, stakeholders and a space. Second, the stakeholders should share a common understanding of the meaning of co-creation.

The second research question was “How the space can enable co-creation?” Four building blocks of co-creation space were discovered in literature review. These were collaborative space, creative space, innovative space and a space for knowledge creation. Also, a model for measuring the experience of the space was introduced. Several suggestions on how the space could enable co-creation were derived based on the case study. The space should reflect the values derived from the goal of the space. Collaboration should be favored internally but also externally. The space should be flexible and it should attract people. The space should also support the building of tangible objects such as prototypes.

The notion of pop-up or temporary co-creation spaces was also briefly investigated. In the literature, it was found that a temporary pop-up space is different from permanent open spaces merely on practical issues such as the building and demolition of the space. It was suggested by the case study that temporary spaces could function as a test platform for co-creation spaces.

Based on the results of the literature review and the case study, a total of nine suggestions can be made for the developers of a co-creation space. This list of suggestions is by no means exclusive. Other aspects, that were not discussed here, could exist and could be discovered by more extensive studies.

The **suggestions for developing a co-creation space** are following.

1. **Stakeholders should share a common understanding of the meaning of co-creation in this particular co-creation space.** The reason behind this lies in the ambiguous definitions and translations of co-creation that can potentially confuse the terminology. Otherwise, it could be difficult to get the people to really collaborate and create together.

2. **The first things to consider are the goal, the stakeholders and the space.** The goals guide the development of the space and later all the actions at the space. The goals should also be effectively exposed and notified to the stakeholders. Some of the stakeholders were unavoidable but usually there is a freedom to choose some stakeholder groups to collaborate with. However, the involvement of each stakeholder groups should be a conscious decision. The space can be present from the very beginning or built later. In each case, it plays a huge part in the development process.

3. **The values that are derived from the goal of the space should be reflected by the space**. The physical space acts as a medium for co-creation. The space should promote such factors as openness, flexibility, neutrality, collaboration and unexpectedness.

4. **The openness, collaboration and sharing should be exercised both internally and externally.** A space should not be developed without visits to and networking with other spaces. Discoveries and learnings accomplished should be shared with internally and externally.

5. **The space should be flexible.** The spaces should be designed to enable different kind of activities and the interaction of multiple stakeholders. The space should support various ways of working, with the focus on collaborative methods. There should also be possibilities to convert and adjust the space according to the needs of the users.

6. **The space should attract people.** Co-creation is dependent on people. The people can be attracted by offering various kind of services. Providing these services should communicate to the users that it is acceptable and desirable to pass time at the space.

7. **The possibility to build tangible prototypes and other physical presentations is important.** Tangible objects can stimulate creativity, innovation and ideation.

8. **Temporary spaces could be effective on testing co-creation in a particular case.** Pop-up co-creation spaces could work as an experimentation-driven development of the co-creation spaces. After a co-creation space have been launched and has functioned some time it can be measured with the 6T model.

9. **The co-creation space is never ready.** The spaces were constantly development further. The users should be listened as part of the development process. Using co-creation methods in the development of the co-creation space could also lead to a better design.

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